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Food Consumption and Nutrition Division of the International Food Policy Research Institute

Discussion Paper 168

Long-Term Consequences of Early Childhood Malnutrition

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Individuals in both developing and developed countries are subject to exogenous shocks. When such events generate variations in consumption—as in cases where households are unable to fully insure against such shocks—they lead to losses of utility. The significance of such losses, from a policy point of view, depends partly on whether such shocks induce path dependence. Where temporary shocks have such long-lasting impacts, utility losses may be much higher. Assessing the impact of such shocks, however, is problematic for two reasons. First, unobservable characteristics correlated with the likelihood of exposure to such initial shocks could account for phenomenon such as scarring. Second, households or individuals might respond to such shocks in ways that mitigate or exacerbate their initial effects.

Purpose of This Paper

This paper explores the long-term consequences of shocks on individuals' well-being. It links the literature on shocks to the literature on the determinants of preschooler health status, extending these analyses by linking transitory shocks experienced prior to age 3 to preschool nutritional status (measured by height-for-age) to subsequent health and education attainments.

Methodology and Results

The paper uses a unique longitudinal data from rural Zimbabwe. Two surveys, conducted in 1983/84 and 1987, collected data on the anthropometric status of approximately 680 preschoolers. In 2000, the authors returned to these localities and traced these children, obtaining schooling histories on nearly all of them and new measures of stature for approximately 60 percent of the original sample. Specification tests revealed that attrition was largely a function of observable household characteristics.

Next, the paper uses representations of exposure to Zimbabwe's civil war in the late 1970s and exposure to the 1982-84 drought to identify differences in preschool height-for-age across siblings in this sample. These shocks are highly correlated with preschool height-for-age but do not have any long-term effect on height and schooling attainments over and above their effect on preschooler height. Lastly, instrumental variables–maternal fixed-effects (IV-MFE) estimation is used to show that improvements in height-for-age in children under 5 are associated with increased height as a young adult, a greater number of grades of schooling completed, and an earlier age at which the child starts school (though this last effect is relatively weak). The magnitudes of these statistically significant effects are functionally significant as well. Had the median preschool child in this sample had the stature of a median child in a developed country, by adolescence, she would be 4.6 centimeters taller, have completed an additional 0.7 grades of schooling, and have started school seven months earlier. The paper presents calculations that suggest that this loss of stature, schooling, and potential work experience results in a loss of lifetime earnings of 7–12 percent and that such estimates are likely the *lower* bounds of the true losses.

Poor preschool nutritional status is causally associated with a loss of stature, schooling, and potential work experience, which, in turn, results in an [estimated] loss of lifetime earnings of at least 7-12 percent.

Discussion and Implications

The paper speaks to several audiences. First, it contributes to the literature on shocks and consumption smoothing, but unlike much of the literature, this paper looks at the impact on the individual rather than the household. Second, it

extends the literature on the determinants of human capital formation. There are numerous cross-sectional studies that document associations between preschool nutritional status and subsequent human capital attainments. However, many of these studies document associations between preschool malnutrition and subsequent attainments, not causal relationships. Preschooler health and subsequent educational attainments both reflect household decisions regarding investments in children's human capital.

Third, the United Nations estimates that one out of every three preschoolers in developing countries—180 million children under age 5—exhibit at least one characteristic of malnutrition: stunting. Because improving preschooler health and nutrition are important development objectives in their own right, many international organizations, including the Department for International Development (DfID) and the World Bank, are prioritizing improvements in child health and nutrition. These organizations also emphasize increasing schooling attainments and are committed to the International Development Targets of Universal Primary Education by 2015.

An implication of these results is that improvements in preschool health status and primary education are not competing objectives; rather, improved preschool nutrition will facilitate meeting the education objectives.

Further, if improving preschool nutritional status enhances the acquisition of knowledge at school and leads to higher attained heights as adults, these improvements have added value where there exist positive associations between schooling and productivity, and height and productivity.

Lastly, while our focus lies in the realm of shocks and human capital attainments in developing countries, it is worth noting that our methods are applicable to a much wider class of problems. Specifically, we argue that studies that convincingly link initial states, whether they be health (as in this study) or other states including to subsequent outcomes such as human capital formation (as in this study), must meet three criteria. First, they must control for unobservable heterogeneity. Second, such controls require the use of longitudinal data. But such data are not without their own dangers, most notably the potentially confounding effects of attrition bias. Third, they must take into account the fact that these initial states are also outcomes and, as such, are endogenous.

Keywords: preschool nutrition, health, education, shocks, Zimbabwe

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